

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ\text{C}$
30V	3.0Ω @ $V_{GS} = 10\text{V}$	250mA
	3.8Ω @ $V_{GS} = 5\text{V}$	200mA

## Description and Applications

This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

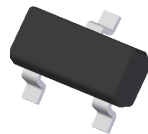
- Motor Control
- Power Management Functions
- Backlighting

## Features and Benefits

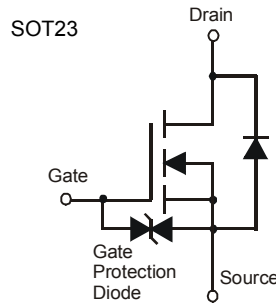
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected 2KV**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

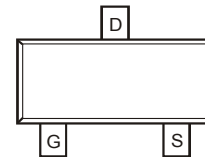
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208<sup>(e3)</sup>
- Weight: 0.008 grams (approximate)

**NEW PRODUCT**


Top View



Equivalent Circuit



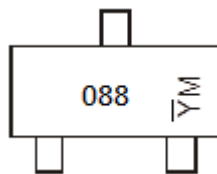
Top View

## Ordering Information (Note 4)

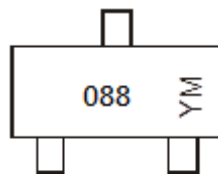
Part Number	Compliance	Case	Packaging
DMN33D8L-7	Standard	SOT23	3000/Tape & Reel
DMN33D8L-13	Standard	SOT23	10000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



Chengdu A/T Site



Shanghai A/T Site

088 = Product Type Marking Code  
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 ȲM = Date Code Marking for CAT (Chengdu Assembly/ Test site)  
 Y or Ȳ = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

Year Code	2014	2015	2016	2017	2018	2019	2020
Code	B	C	D	E	F	G	H

Month Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	250	mA
		$T_A = +70^\circ\text{C}$		200	
Continuous Drain Current (Note 6) $V_{GS} = 5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	200	mA
		$T_A = +70^\circ\text{C}$		150	
Maximum Continuous Body Diode Forward Current (Note 6)			$I_S$	0.5	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%) (Note 6)			$I_{DM}$	0.8	A

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			$P_D$	350	mW
Thermal Resistance, Junction to Ambient (Note 5)		Steady State	$R_{\theta JA}$	357	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)			$P_D$	520	mW
Thermal Resistance, Junction to Ambient (Note 6)		Steady State	$R_{\theta JA}$	240	$^\circ\text{C/W}$
Operating and Storage Temperature Range			$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	—	3.0	$\Omega$	$V_{GS} = 10\text{V}, I_D = 100\text{mA}$
		—	—	3.8		$V_{GS} = 5\text{V}, I_D = 10\text{mA}$
Forward Transfer Admittance	$ Y_{fs} $	80	—	—	ms	$V_{DS} = 10\text{V}, I_D = 0.2\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.75	1.1	V	$V_{GS} = 0\text{V}, I_S = 115\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	50	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	12	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	10	—	pF	
Total Gate Charge	$Q_g$	—	1.2	—	nC	$V_{GS} = 10\text{V}, V_{DS} = 10\text{V},$ $I_D = 250\text{mA}$
Gate-Source Charge	$Q_{gs}$	—	0.2	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	0.1	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	2.3	—	ns	$V_{DD} = 30\text{V}, I_D = 0.2\text{A}, V_{GEN} = 10\text{V},$ $R_{GEN} = 25\Omega$
Turn-On Rise Time	$t_r$	—	3.8	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	17.6	—	ns	
Turn-Off Fall Time	$t_f$	—	16.2	—	ns	

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout
  - Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

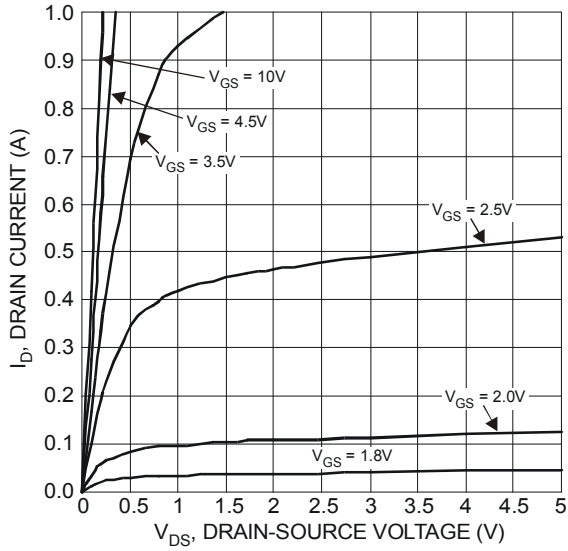


Figure 1 Typical Output Characteristics

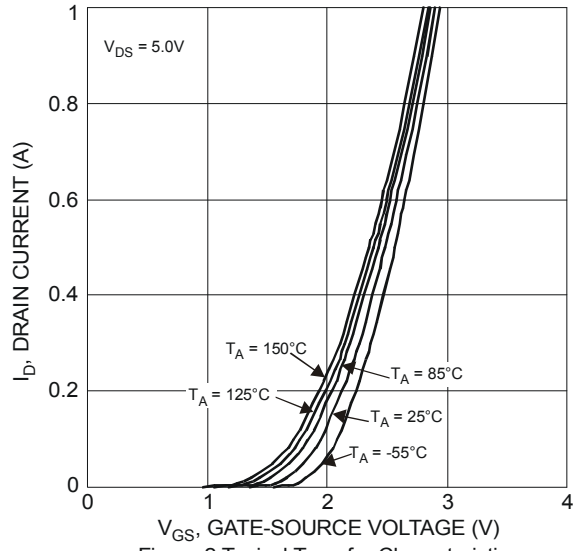


Figure 2 Typical Transfer Characteristics

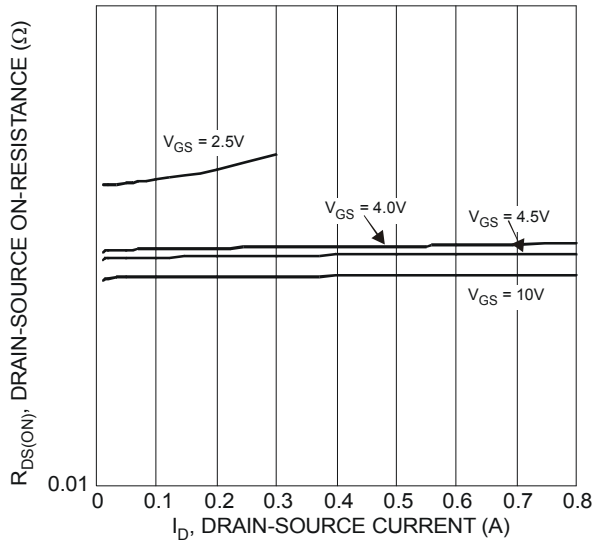


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

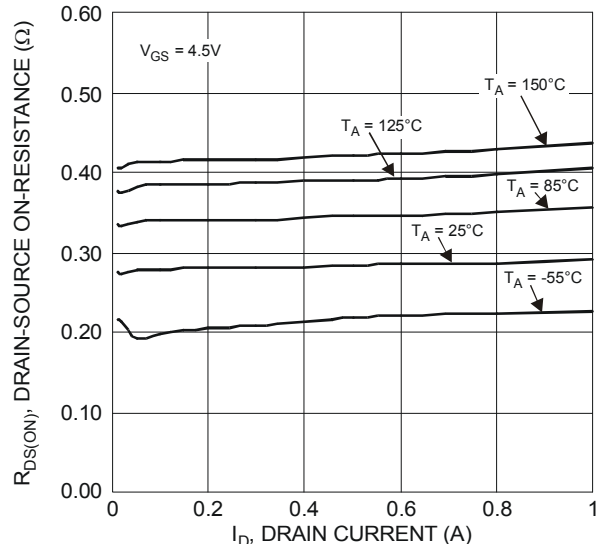


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

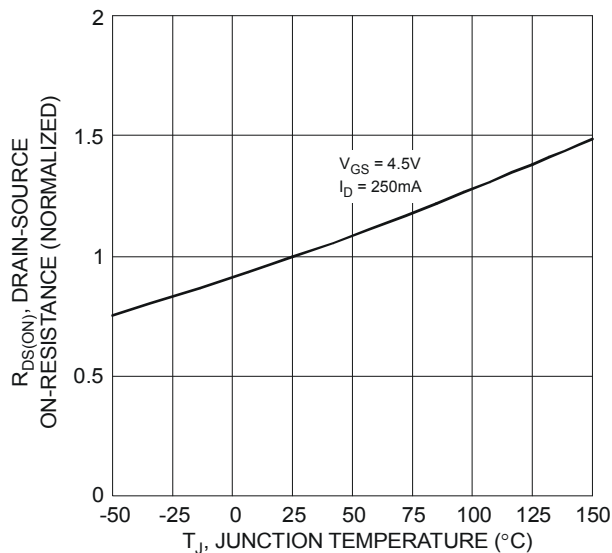


Figure 5 On-Resistance Variation with Temperature

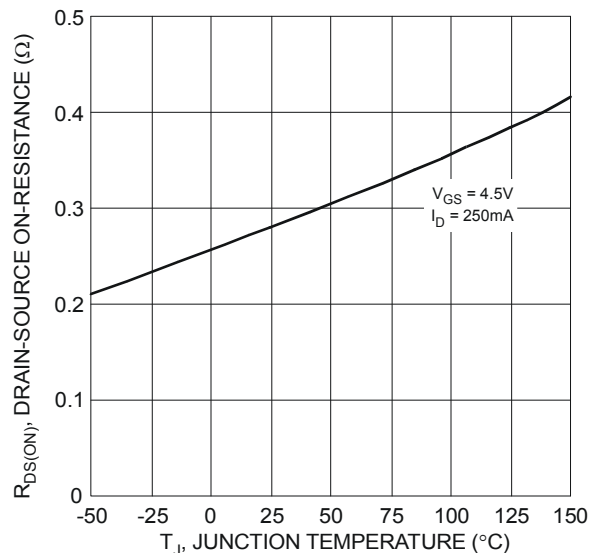


Figure 6 On-Resistance Variation with Temperature

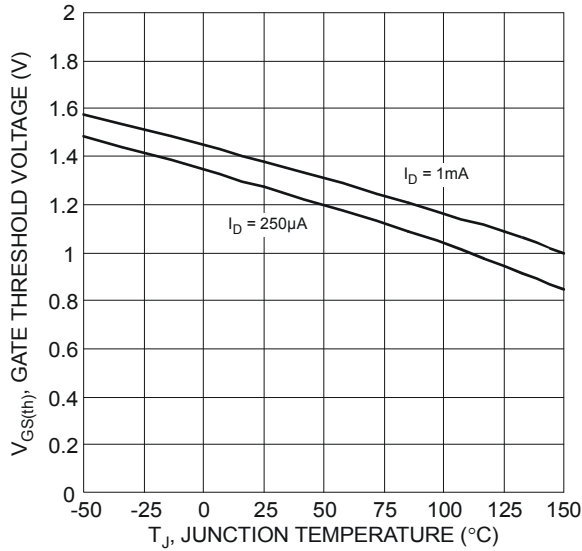


Figure 7 Gate Threshold Variation vs. Ambient Temperature

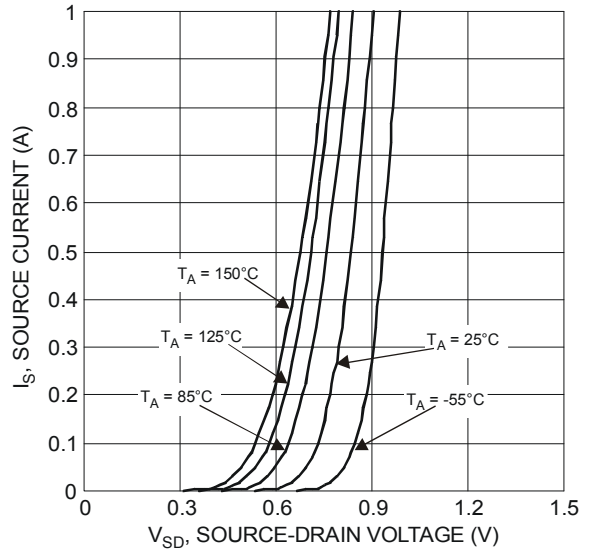


Figure 8 Diode Forward Voltage vs. Current

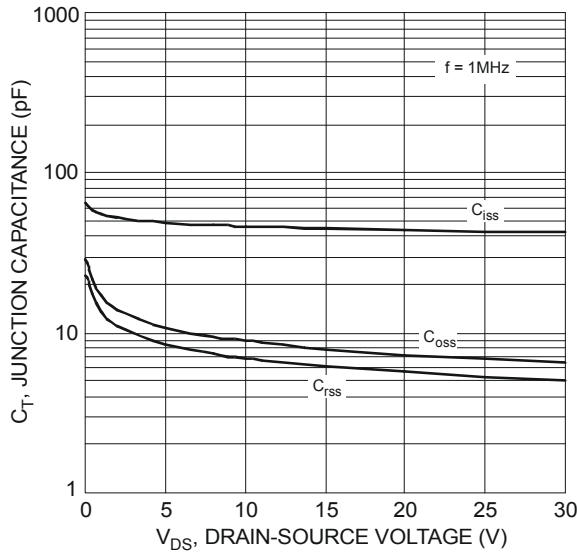


Figure 9 Typical Junction Capacitance

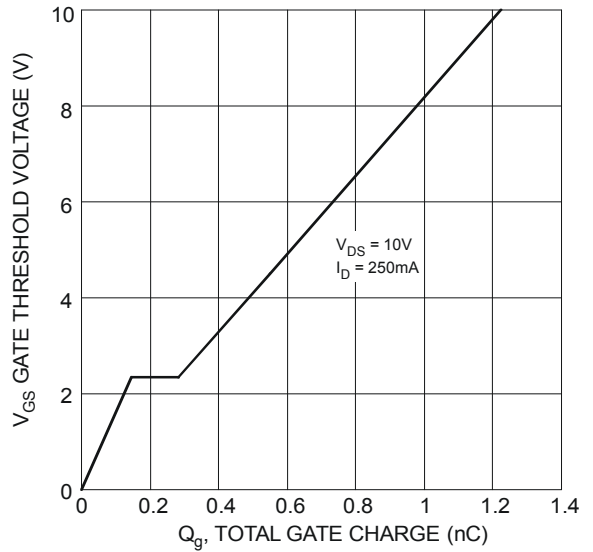
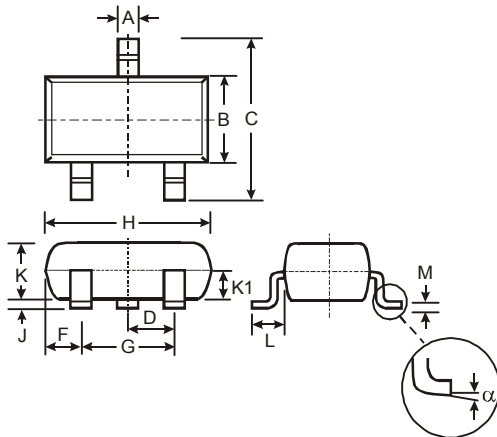


Figure 10 Gate Charge

## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

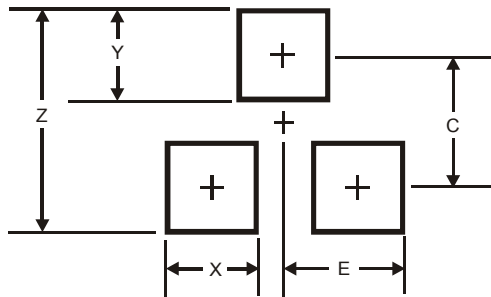


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-

**All Dimensions in mm**

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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